

## WHAT IS CLAIMED IS:

1. A deep trench structure manufacturing process, comprising the steps of:
  - 5 providing a substrate;
  - forming a deep trench in said substrate;
  - forming a dielectric layer in said deep trench, said dielectric layer covering the sidewall and bottom of the deep trench;
  - filling the deep trench with a first polymer;
  - 10 removing a portion of said dielectric layer not covered by said first polymer;
  - refilling the deep trench with another dielectric layer, said another dielectric layer covering a portion of the sidewall of the deep trench not covered by said first polymer;
  - removing unnecessary portion of said another dielectric layer;
  - forming a collar oxide layer in the deep trench, said collar oxide layer covering a portion
  - 15 of the sidewall of the deep trench not covered by the dielectric layers;
  - filling the deep trench with a second polymer;
  - removing a portion of said collar oxide layer not covered by said second polymer; and
  - filling the deep trench with a third polymer.
2. The process as recited in Claim 1, wherein the material of said dielectric layer is the
- 20 same as that of said another dielectric layer.
3. The process as recited in Claim 2, wherein the material of said dielectric layer and said another dielectric layer is nitride.
4. The process as recited in Claim 3, wherein the material of said dielectric layer and said another dielectric layer is silicon nitride.
- 25 5. The process as recited in Claim 1, wherein said another dielectric layer is a nitride layer.
6. The process as recited in Claim 5, wherein the material of said another dielectric layer is silicon nitride.